

IR-1641 (2-1929)

TITLE: MOSFET WITH REDUCED THRESHOLD VOLTAGE AND  
ON RESISTANCE AND PROCESS FOR ITS  
MANUFACTURE

ABSTRACT OF THE DISCLOSURE

A vertical conduction MOSFET having a reduced on resistance  $R_{\text{DS(on)}}$  as well as reduced threshold voltage  $V_{\text{th}}$ , and an improved resistance to punchthrough and walkout has an extremely shallow source diffusion, of less than 0.3 microns in depth and an extremely shallow channel diffusion, of less than about 3 microns in depth. In a P channel version, phosphorus is implanted into the bottom of a contact trench and into the channel region with an implant energy of 400 keV for a singly charged phosphorus ion or 200 keV for a doubly charged ion, thereby to prevent walkout of the threshold voltage.